

REMARKS

Claims 1, 2, 3 and 10 are amended; marked up versions of the amended claims are attached hereto pursuant to 37 C.F.R. § 1.121(c)(ii). Claims 1-17 are pending. Claims 11-17 are withdrawn from consideration. Claims 1-10 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

The present invention is directed to ceramic materials useful for producing optical fiber connector members and to a ferrule comprised of the ceramic compositions of the present invention. In one embodiment, the ceramic materials of the present invention are zirconia based ceramic materials stabilized by Y_2O_3 having extremely small amounts of impurities such as SiO_2 and TiO_2 . In another embodiment, the ceramic materials of the present invention are zirconia based ceramic materials stabilized by a stabilizer other than Y_2O_3 and which does not substantially contain Y_2O_3 . Applicant has discovered that the weight of the ferrules made of the ceramic compositions of the present invention only slightly increases when subjected to high temperature and humidity over a long period.

Claims 1-4 and 10 are rejected under 35 U.S.C. Section 102(e) as being anticipated by Oomichi et al. U.S. Patent No. 6,087,285. (Office Action, Paragraph 5). Oomichi '285 is directed to a zirconia sintered body which contains Y_2O_3 in a solid solution state, and has tetragonal crystal grains oriented at an orientation degree not higher than 45%.

Applicant believes that amended claims 1-3 patentably distinguish over Oomichi et al. As amended Claims 1-3 include the limitation that the zirconia based ceramic (Claims 1 and 3) and the starting material for making the ceramic (Claim 2) contain less than 0.1% wt% or less of each of SiO_2 , TiO_2 , CaO , Na_2O and Fe_2O_3 . Applicant has discovered that the limitation relating to low levels of these these metal oxides is important in preventing the formation of glass phases in the grain boundaries of the zirconia matrix, thereby avoiding degradation of the

ferrules while used over long periods of time in the high temperature and high humidity conditions in which said ferrules are used. While Oomichi discloses keeping the concentrations of SiO_2 and TiO_2 to not greater 0.02%, Oomichi fails to either teach or suggest the limitation that the concentrations of CaO , Na_2O and Fe_2O_3 should be below 0.1% in the zirconia based ceramic and the starting material used to make such ceramic. As such, Applicant believes that claims 1, 2 and 3, as amended, patentably distinguish over Oomichi et al. Allowance of these claims, as amended, is respectfully requested.

Applicant respectfully requests withdrawal of the rejection of as to claims 4-10 because the present invention antedates the Oomichi reference. As such, Applicant believes that Oomichi et al. is not prior art with respect to Claims 4-10. Oomichi, which issued July 11, 2000, was filed on October 8, 1998 in the United States. Thus, Applicant believes the effective date of Oomichi '285 for 102(e) purposes is October 8, 1998, its U.S. filing date. The foreign priority date of Oomichi cannot be used to show that it was filed before applicant's date of invention. See In re Hilmer, 359 F. 859, 878 (C.C.P.A. 1966). Conversely, Applicant is entitled to rely on a claim of priority under 35 U.S.C. Section 119(a) -(d) to antedate Oomichi '285. Claims 4-10 of the present invention take priority from Japanese Patent Application 9-328973 filed November 28, 1997. A certified copy of the Japanese Patent Application 9-328973 was filed on November 28, 1998. Attached hereto is an English translation of the priority document. As such, Oomichi '285 is not prior art with respect to claims 4-10. For the reasons below, Applicant respectfully requests that the rejection of Claim 4 -10 be withdrawn, and the claims allowed.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oomichi '285 as applied to Claim 4 above, and further in view of Seth, U.S. Patent No. 4,921,328. Seth '328 is directed to an inorganic, polycrystalline, ferroelectric fiber with a diameter of from about 1 micron to 1 millimeter, a porosity of less than



about 40 percent, a density of at least about 60 percent of theoretical density, and a coarbonaceous material content of from about 0 to about 5 percent. The Office asserts that Seth '328 shows that it is known to proved an optical member is a ferrule having a through hole to hold a end portion of a fiber therein (Table 3) (Office Action, at p. 5, para. 7).

Claim 5 depends from Claim 4. Claim 5 is directed a ferrule having through hole to hold an end portion of a fiber, wherein the ferrule is comprised of a ceramic material having 0.1% or less of rate of change in weight while the material is held at a temperature of 85oC and relative humidity of 85% for 2000 hours. As shown herein, the Oomichi '328 Patent is not prior art against the present application, and as such Applicant believes that Oomichi '328 may not be used in connection with a rejection under sections 102(e) or 103(a) as applied to Claim 4 or Claim 5. Seth '328 fails to teach the ferrule is a ceramic having the properties of Claim 5. As such, applicant believes that the present invention patentably distinguishes over Seth '328. Withdrawal of the rejection as to Claim 5 is respectfully requested.

Claims 6, 7, 8 and 9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Oomichi et al. '285 and Seth '328 as applied to Claim 4 or 5 above and further in view of Matsumoto et al. '911. Applicant believes that Claims 4 and 5 are patentable as discussed above. Matsumoto et al. '911 is directed a ceramic comprising a matrix of Al_2O_3 , ZrO_2 (partially or fully stabilized) or mixtures of Al_2O_3 and ZrO_2 with strontium aluminate plate-shaped grains distributed throughout the matrix. Matsumoto et al. '911 discloses that Y_2O_3 , as well as MgO and other oxides, may be used to stabilize the claimed strontium aluminate ceramics of Matsumoto.

Claims 6, which depends from Claim 4, is directed to an optical connector member comprised of ceramic material, wherein the ceramic material is a zirconia based ceramic which is stabilized by a stabilizer other than Y_2O_3 and does not substantially contain Y_2O_3 . Applicant respectfully traverses the rejection. Claim 6



is limited to zirconia based ceramics stabilized by a stabilizer other than Y_2O_3 and which does not substantially contain Y_2O_3 . As shown herein, Applicant's invention antedates the Oomichi '328 Patent and as such, applicant believes Oomichi cannot be applied as a reference to Claim 6 in connection with a rejection under section 103(a). Neither Seth '328 or Matsumoto '911 fairly teach or suggest ceramic materials that are stabilized by a stabilizer other than Y_2O_3 and do not substantially contain Y_2O_3 . Matsumoto '911 specifically teaches that the strontium aluminate compositions of Matsumoto may be stabilized with yttria (Examples 22-24). As such, Applicant believes that Claim 6 patentably distinguishes over the citable prior art.

Claims 7, 8 and 9 depend from Claim 6 and are patentable for the same reasons as Claim 6.

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.



If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

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Version with markings to show changes made:

1. (Amended) A zirconia based ceramics, containing ZrO_2 as a main component, 2-4 mol% of Y_2O_3 , 0.05-1.0 wt% of Al_2O_3 , and 0.1 [0.01] wt% or less each of SiO_2 , [and] TiO_2 , CaO , Na_2O and Fe_2O_3 .

2. (Amended) A method of producing a zirconia based ceramic, comprising steps of:
refining starting materials including ZrO_2 and Y_2O_3 to contain 0.1 [0.01] wt% or less each of SiO_2 , [and] TiO_2 , CaO , Na_2O and Fe_2O_3 ;
forming a mixture of the starting materials to a desired shape; and,
firing the shaped material at a temperature in a range of 1300-1600°C to obtain a sintered zirconia based ceramics which contains 0.05-1.0 wt% of Al_2O_3 .

3. (Amended) An optical connector member formed of a zirconia based ceramics, containing ZrO_2 as a main component, 2-4 mol% of Y_2O_3 , 0.05-1.0 wt% of Al_2O_3 , and 0.1 [0.01] wt% or less each of SiO_2 , [and] TiO_2 , CaO , Na_2O and Fe_2O_3 .

10. (Amended) An optical connector member according to Claim 4 or 5, wherein the ceramic material comprises a zirconia based ceramics which contains ZrO_2 as a main component, 2-4 mol% of Y_2O_3 , 0.05-1.0 wt% of Al_2O_3 , and 0.1 [0.01] wt% or less each of SiO_2 , [and] TiO_2 , CaO , Na_2O and Fe_2O_3 .